Monodromy data of Frobenius manifolds and twisted Yangians arising in Teichmüller theory of orbifold Riemann surfaces — Leonid Chekhov, February 6, 2010

We give a fat-graph description of Teichmüller spaces of Riemann surfaces with holes and with $\mathbb{Z}_2$- and $\mathbb{Z}_3$-orbifold points (conical singularities) in the Poincaré uniformization. We present the corresponding mapping-class group transformations, construct geodesic functions, and introduce the Poisson structure. We then quantize the resulting Poisson algebras. In the particular cases of surfaces with n $\mathbb{Z}_2$-orbifold points and with one or two holes, we obtain the respective A_n- and D_n-algebras of geodesic functions (classical and quantum). We associate the infinite-dimensional Poisson algebra $\mathfrak{D}_n$, which is the semiclassical limit of the twisted q-Yangian algebra $Y'_q(\mathfrak{o}_n)$ for the orthogonal Lie algebra $\mathfrak{o}_n$, to the algebra of geodesic functions on an annulus with n $\mathbb{Z}_2$-orbifold points. We find the braid-group action on this algebra. Using this result, we construct the braid-group actions on the finite-dimensional reductions of this algebra: the p-level reduction and the D_n-algebra. We find the central elements for these reductions. We also interpret the $\mathfrak{D}_n$-algebra as the Poisson algebra of monodromy data of a Frobenius manifold in the vicinity of a non-semisimple point.